IGARSS 2000 ABSTRACT SUBMISSION TEMPLATE

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ABSTRACT TITLE:

The Application of L-band, C-band, and Ku-band Radar Measurements to Monitoring Land Snow Cover

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ABSTRACT TEXT:

Text block boundaries are fixed. Abstract cannot exceed boundaries.

L-band and C-band microwave radar observations can help to measure the properties of snow cover on land by providing information about the soil-snow boundary condition. In this theoretical study, we examine the sensitivities of microwave radar measurements to soil and snow characteristics, and we compare a simple model with previously published data. Depending on the surface roughness, co-polarized ratios or singe polarization time ratios of radar backscattering may be affected only by the incidence angle and the dielectric contrast at the soil-snow boundary. These measurements can reduce the number of unknowns in any corresponding higher frequency observations which are also affected by the lower boundary condition. The co-polarized ratio is sensitive first of all to the snow density which offers the possibility of measuring this parameter directly if a separate measurement of the soil temperature from a passive microwave system is also available. The thermal insulation provided by snow cover can have a powerful effect on the soil-snow boundary by altering the soil temperature and therefore changing the dielectric contrast. Because the microwave response of snow cover is so sensitive to the conditions of the underlying frozen soil, it is important for future ground truth campaigns to collect data on the temperature, water content, and texture of the soil in addition to measuring snow conditions.

TOPIC PREFERENCE: A.29: Sea Ice, Snow, and Glacier Monitoring